FEATURED ACTIVITIES of DERT
October 2011

MEETINGS

C-MERC – Coastal and Marine Mercury Ecosystem Research Collaborative
July 23, 2011
Halifax, Nova Scotia

Background: Despite the significant connections between the bioaccumulation of mercury in marine food webs and dietary consumption of fish by humans, many important uncertainties and gaps exist in our understanding of the sources of methylmercury in marine systems and the pathway to human exposure. At this invitational workshop, organized by the Dartmouth Superfund Research Program, scientists and policy-makers convened to synthesize knowledge about the key processes related to the input, cycling and uptake of mercury in marine organisms.

Meeting Highlights: This forum began with presentations highlighting progress made on a series of papers that will be published in Environmental Toxicology and Environmental Health Perspectives. Specifically, topic areas included a series of papers on Ocean Systems: Gulf of Maine, Gulf of Mexico, the San Francisco Bay, Tropics, Arctic, and the open ocean. The Global Issue topic area included papers on the effects of nutrient loading on mercury dynamics in ecosystem; climate change and methylmercury in coastal wetland ecosystems; high exposure groups compared to low exposure groups; mercury and selenium interactions: relevance for human health effects; fish – communicating nutritional, toxicant and environmental effects; and mercury science and policy in a marine context. Following these presentations participants met in breakout session to further discuss these topics. *Dr. Thompson, SPHB*, participated and contributed to the discussion focused comparison of low level Hg effects to high exposure as well as the communicating nutritional, toxicant and environmental effects related to fish mercury levels.

Outcomes: This forum is a work in progress with participants committed to continue their analysis and assessment of the field. Subsequent to the workshop a series of papers will be submitted to EHP.

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Meeting: Breast Cancer and the Environment Program Integration Meeting
Bethesda Maryland
July 13 -14, 2011

Introduction: *Drs. Les Reinlib, Caroline Dilworth and Claudia Thompson, and Ms. Jennifer Collins, SPHB*, presented and led discussions at the Integration Meeting of the Breast Cancer and the Environment Research Program (BCERP) in Bethesda, Maryland. The meeting brought together basic scientists, epidemiologists, communications experts, advocates, and community partners for cross-expertise discussions to enhance collaborations amongst the program's nine projects. Approximately 80 members attended and met in joint discussions and also smaller groups. Dr. Reinlib was a member of the organizing committee for this meeting that was co-sponsored by NCI.

The meeting covered a variety of opportunities for interaction among disciplines and the overall concept of the program goals – which is, to understand the impact of early exposures for adult disease and to use the findings to better predict breast cancer risk - and Transdisciplinary structure that could well

serve as a model for future programs. In addition, BCERP members also met by program component to make headway towards joint needs, such as in the Puberty Study and collaborations.

The guiding Transdisciplinary approach was foremost among the discussions and led to agreement that a joint statement of goals and collaborations would provide novel information about the life course research approach, practical use of multiple levels of analysis; insights into the stages of carcinogenesis (especially initiation), the benefits of incorporating into the projects the aims of constituent (such as the public), and would eventually become a proof of principal leading to predictive value for breast cancer. The Windows of Susceptibility component of the BCERP was heralded as having a rare opportunity to define the early mechanisms of carcinogenesis for the field and future research. Further development of the model was cited as being needed as the studies and data evolve.

Highlights: Among the highlights of the meeting were discussions among those in the community engagement parts of the BCERP. The community engagement representatives who interact directly with the engaged breast cancer community indicated that the BCERP continues to project a high profile, "*fascinated*" in particular among BRCA+ individuals. They devoted considerable forethought, time and deliberation to fashioning proper science-based messages for their audiences.

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Symposium Regarding Arsenic Exposures and Disease Etiology
June 29 – July 1, 2001
Hanoi, Vietnam

Introduction: Studies regarding arsenic exposures and disease etiology are a strong focus of the SRP research investment. This symposium built on a series of meeting on the same topic held at the Chulabhorn Research Institute (CRI), Bangkok, Thailand on June 27-28. Symposium discussions related to arsenic exposure and its impact on human health. The symposium was designed to identify solutions to human environmental health problems from arsenic exposures and to facilitate the establishment of sustainable collaborative programs. Many governmental and academic research centers globally have been collecting information on health effects from exposures at local hazardous waste sites, studying the mechanisms of such harmful effects on the human body, and devising and testing novel intervention/prevention methods.

Meeting Highlights: Officials present at the symposium included Professor Dr. Her Royal Highness Princess Chulabhorn Mahidol; the Vice Minister of Health of Vietnam, Prof. Dr. Trinh Quah Huan: the Deputy Director General, Dept. of International Cooperation, Dr. Nguyen Thi Minh Chau; the Director of the Vietnamese National Institute of Environmental Health (NIOEH), Dr. Nguyen Bao; and in addition many researchers from the US, Thailand and Vietnam. Following the morning symposium on July 29, an afternoon session was convened to discuss the ongoing progress of the pilot study being conducted in Ha Nam Province – a study focused on the validation of gene expression biomarkers for arsenic exposure in pregnant moms and their fetuses. Topics included progress to date, subject recruitment and sample collection, water analysis and timelines for completing the study. On June 30th the research party conducted a field visit to Ha Nam province and viewed facilities where the research project would be conducted.

Drs. William Suk and Claudia Thompson both attended the meeting, contributed to the discussion with the National representatives regarding the protocols to be used in the field studies and participated in a field trip to Ha Nam Province, the site of six health clinics where the study subjects will be giving birth and samples collected. Dr. Suk also gave a lecture entitled "Arsenic as a Model for Addressing Human

Health Needs and Disease Outcomes" at the symposium providing the participants with the current research trends in arsenic as a model in global environmental health.

Outcomes: An outcome of the symposium will be on translating existing knowledge and research into protective policies.

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Engineered Tissue Models for Environmental Health Sciences Research: Symposium and Workshop
June 27-28, 2011
Research Triangle Park, North Carolina

Introduction: Biomedical researchers often rely on cell culture systems to investigate the effects of environmental chemicals on cells because of their ease of use, reliability, and freedom from external influences present in isolated tissue or whole organism systems. However, many responses at the tissue and organism scale require signaling between multiple cell types and traditional cell culture systems often fail to replicate a normal physiological response to an environmental perturbant. Over the past decade there has been an emergence of culture systems that include multiple cell types grown on 3-dimensional scaffolds that offer the ease and convenience of monoculture, but more faithfully reflects the response of the target tissue. In addition, these engineered tissue systems can be linked to 'omic technologies or high throughput screening systems and computational models of organ, system, and organism function to increase the ability to translate the findings of the model to organism level responses. NIEHS has supported this effort through our SBIR program, the Bioengineering Research Grants program and the ARRA challenge grants.

Drs. David Balshaw (CRIS) and Ray Tice (DNTP) organized a 1 ½ day meeting comprised of a public symposium of NIEHS supported efforts in tissue engineering and a workshop to discuss the opportunities afforded by these approaches and barriers to their success. The symposium featured presentations on a range of model systems including those that are well developed like lung, liver, skin and those less developed, such as vasculature, breast, neuronal. The second half of the meeting day featured a small working group discussion of recommendations from the participants to the NIEHS on developing this aspect of our portfolio.

Meeting Highlights: The Symposium on June 27th featured many excellent presentations including an outstanding keynote address by Dr. Donald Ingber; Director of the Wyss Institute, on their efforts to develop a series of microfluidically enabled human derived organ systems with a long range goal of providing a multi-system 'human on a chip.' Their system incorporates a novel approach that mimics the stress and strain on the tissue that occurs during normal biological function that is critical in bridging between in vitro and in vivo systems. This theme was echoed by other speakers; a critical aspect of 3D engineered systems is that they include biological forces as part of the response.

The second day's round-table discussions resulted in the formulation of a series of recommendations to NIEHS. One of the critical recommendations was the need for further discussions such as this one, an effort that brings together the scientists who are developing these models to discuss their approaches and formulate a series of standardized approaches and best practices for the field as a whole. A second, general, recommendation was that such efforts are inherently multi-disciplinary and that efforts are needed to both train a new cadre of interdisciplinary scientists and support the multi-disciplinary teams to conduct this research. This was further expanded to stress the importance of partnerships between NIH Institutes and other government agencies and international groups to build this science.

Recommendations: The group also formulated more specific recommendations for research efforts including one to integrate the goals of the tissue engineering effort with those of the NIEHS Exposure Biology Program and the NIH Genes, Environment and Health Initiative. The recommendation was for NIEHS to support an effort to produce induced pluripotent cells from many individuals and to use those cells to develop engineered organ systems that broadly represent human genetic diversity and then to integrate them into a moderate throughput screening system comparable to that employed by the Tox21 effort. The resulting studies would enable a meaningful study of the biological effects of combined genetic and environmental factors underlying disease etiology.

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"Sustainable Remediation 2011: State of the Practice – Green Chemistry, Human Health, and Environmental Response"
June 1-3, 2011
University of Massachusetts-Amherst

Introduction: Green and sustainable remediation (GSR) approaches take into account the full life cycle of a remediation process seeking to maximize efficiency in the use of resources and to minimize the impact to human health and ecosystems. In a global sense, GSR achieves a net reduction in the overall detrimental consequences of hazardous substances – rather than creating an environmental problem in another location or media. Green remediation is the practice of considering all environmental effects of remedy implementation and incorporating options to minimize the environmental footprints of cleanup actions. Sustainable remediation is broadly defined as a remedy or combination of remedies whose net benefit on human health and the environment is maximized through the judicious use of limited resources. The Superfund Research Program (SRP) is exploring opportunities for its research and program products to address sustainable remediation. In particular, SRP's mandated site characterization and remediation technology activities offer tremendous potential to introduce innovative approaches to directly (or indirectly) improve the sustainability of remediation activities. As SRP offers basic and applied research opportunities, these GSR approaches may be readily applicable today, or may drive fundamental research to improve devices and technologies for the future. Given its interest in GSR, SRP was a co-sponsor of this Office of Superfund Technology and Remediation Innovation (OSRTI) – funded conference.

Meeting Highlights: Approximately 200 people attended the meeting representing academia, industry, environmental consulting, and government. Heather Henry organized a "Human Health" session and invited Dr. Chris Portier, Director of the Agency for Toxic Substances and Disease Registry, to speak about the human health implications of reuse/redevelopment of former brownfields and industrial buildings. He identified a number of sites where ATSDR conducted investigations where people had been exposed to various hazardous substances because the previous use of a site was not fully investigated or mitigated. The breakout sessions on Human Health followed and featured new guidelines for school and daycare siting to prevent exposures when industrial sites are acquired for reuse. In addition, there was a concern about the use of spray foam insulation (a "green" product because of its energy efficiency benefits) and its potential impact on children's health. To access other talks/abstracts/presentations:
http://www.umass.edu/tei/conferences/SustainableRemediation/Program.htm.

Recommendation: Because State and Local Government laws differ with regard to redevelopment of formerly contaminated properties, there is a lot of variation in how governments trace past uses of properties. One recommendation is that a database is needed to help EPA and ATSDR staff provide

support to state and local governments in order to identify past use risks (or adjacent property risks) to ensure vulnerable populations are not exposed to hazardous substances.

DERT PAPERS OF NOTE

Discovery of the Seventh and Eight Bases of DNA
James Swenberg, DVM, Ph.D.
University of North Carolina at Chapel Hill
NIEHS Grants P30ES010126 and P42ES005948

NIEHS Superfund Research Program Grantees at the University of North Carolina Chapel Hill have discovered the seventh and eighth bases of DNA. These last two bases, called 5-formylcytosine and 5-carboxylcytosine, are actually versions of cytosine that have been modified by Tet proteins, molecular entities thought to play a role in DNA demethylation and stem cell reprogramming. The finding could have important implications for stem cell research, as it could provide researchers with new tools to erase previous methylation patterns to reprogram adult cells. It also could inform cancer research, as it could give scientists the opportunity to reactivate tumor suppressor genes that had been silenced by DNA methylation.

Citation: Shinsuke Ito, Li Shen, Qing Dai, Susan C. Wu, Leonard B. Collins, James A. Swenberg, Chuan He,Yi Zhang. 2011. Tet Proteins Can Convert 5-Methylcytosine to 5-Formylcytosine and 5-Carboxylcytosine. Science. Published online 4 August 2011 [DOI:10.1126/science.1210944]

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Autism and Prenatal Vitamins
Irva Hertz-Picciotto, Ph.D., MPH
University of California, Davis
P01ES011269 and R01ES015359

In a population-based case control study of 566 subjects comparing a group of autistic children to a matched control group of children with normal development, researchers found that mother who didn't take prenatal vitamins were at greater risk of having an autistic child, and certain genetic markers markedly increased the risk.

Researchers examined maternal intake of prenatal vitamins in the 3 months preceding conception and the first month of pregnancy, and they looked for genotypes associated with autism. There was a dose/response relationship - the more prenatal vitamins a woman took, the less likely she would have an autistic child. There was no association with other types of multivitamins and no association with prenatal vitamin intake during the second through the ninth months of pregnancy. Having certain genotypes also increased the odds that a woman would have an autistic child. Children with the COMT 472 AA gene were at increased risk of autism. If their mothers took prenatal vitamins, the odds ratio for this risk of autism was 1.8; if their mothers didn't take prenatal vitamins then the odds ratio jumped to 7.2. This suggests that the maternal-fetal environment can magnify the effects of a susceptibility gene.

The authors think there are plausible biological explanations. Folate and other B vitamins are critical to neurodevelopment. The gene variants were in one-carbon metabolism pathways, therefore, suggesting that methylation mechanisms may be responsible.

Citation: Schmidt RJ, Hansen RL, Hartiala J, Allayee H, Schmidt LC, Tancredi DJ, Tassone F, Hertz-Picciotto I. Prenatal vitamins, one-carbon metabolism gene variants, and risk for autism. Epidemiology. 2011 Jul; 22(4):476-85.

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Microparticle Delivery of Doxorubicin Increases Efficacy for Mesothelioma

Jedd M. Hillegass, Ph.D. and Brooke T. Mossman, Ph.D.
University of Vermont College of Medicine
T32ES007122

NIEHS-supported researchers at the University of Vermont report possible new advances in the treatment of malignant mesothelioma by microparticle delivery of the chemotherapeutic agent doxorubicin. The research was carried out in laboratory animals and builds on previous findings from the same investigators.

Malignant mesotheliomas have a poor prognosis, largely because of their resistance to anti-cancer drugs like doxorubicin and similarly. The current study investigated the use of acid-prepared mesoporous microspheres (APMS) as a delivery vehicle for doxorubicin. APMS have been shown in previous research to be non-toxic in laboratory animals. The investigators injected APMS-doxorubicin intraperitoneally or directly into subcutaneous tumors. In comparison to doxorubicin alone, APMS-doxorubicin enhanced intracellular uptake of the drug and mesothelioma cell death. In the intraperitoneal treated animals, decrease tumor numbers and tumor size was achieved with one third the dose of doxorubicin in the combined form.

This finding suggests that APMS delivery of doxorubicin is an effective treatment for malignant mesotheliomas and reduces the dosage of the drug necessary to achieve tumor regression.

Citation: Hillegass JM, Blumen SR, Cheng K, MacPherson MB, Alexeeva V, Lathrop SA, Beuschel SL, Steinbacher JL, Butnor KJ, Ramos-Niño ME, Shukla A, James TA, Weiss, DJ, Taatjes DJ, Pass HI, Carbone M, Landry CC, Mossman BT. Increased efficacy of doxorubicin delivered in multifunctional microparticles for mesothelioma therapy. Int J Cancer. 2011 Jul 1; 129(1):233-44.

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Genetic Map of African-Americans will Aid the Study of Diseases

Benjamin Rybicki, PH.D. Henry Ford Health System and
John Wienke, Ph.D., University of California San Francisco
R01ES011126 and R01ES006717

A large multi-institutional team of researchers, including NIEHS grantees, has constructed a detailed genetic map from a population of more than 30,000 African-Americans that will be used to better understand the causes of disease and human evolution. This new map is the first built from an African-American population.

The map holds promise for both broad genome-wide applications and narrowly focused single disease research. The map will be helpful in studying diseases with a genetic basis especially those that strike African-Americans frequently like hypertension, diabetes, etc. A surprising finding was that the map turned out to be very different than maps based on people of European and other non-African ancestry. The authors think this is due to recombination that has occurred in the U.S. population over the last two or three centuries. It turns out that African-Americans have genetic machinery for recombination that is

different than Europeans. The team discovered that a 13 base-pair motif responsible for many recombination hotspots in Europeans accounts for only two-thirds as much recombination in African-Americans. The remaining third is connected to a newly identified motif of 17 base-pairs.

These findings are expected to help researchers understand the underlying causes of congenital conditions that occur more often in African-Americans and will also be invaluable in discovering new disease genes in all populations.

Citation: Hinch AG, et.al. The landscape of recombination in African Americans. Nature. 2011 Jul 20;476(7359):170-5.

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Some "Bisphenol Free" Bottles Live Up to Their Claim

Scott M. Belcher, Ph.D., and James E. Cooper, Ph.D.
University of Cincinnati
RC2ES018765, R01ES015145, P30ES006096 and T32ES016646

University of Cincinnati researchers tested a variety of bottles claiming to be "BPA free" and found conflicting results according to a new study. The study was prompted by consumer concerns and was conducted to see if bottles made of materials other than polycarbonate lived up to their claim or leached BPA into water stored in them for five days.

The bottles tested were obtained from retail sources and were made of polycarbonate, stainless steel, copolyester, aluminum with a copolyester lining, or aluminum with an epoxy resin lining.

As expected, the lab found that water stored in polycarbonate bottles contained BPA at the end of the five days. This confirmed previous results from the same lab. Aluminum bottles coated with an epoxy resin gave conflicting results depending on the manufacturer. Bottles obtained from discount stores released significantly more BPA.

The researchers conclude that just because a bottle is not made of polycarbonate that it is free of BPA. Some alternative bottles were indeed BPA free, but consumers should be wary.

Citation: Cooper JE, Kendig EL, Belcher SM. Assessment of bisphenol A released from reusable plastic, aluminium and stainless steel water bottles. Chemosphere. 2011 Jul 7. [Epub ahead of print]

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Genetic Link Determined for Prostate Cancer in African-American Men

Yuko Yamamura, Ph.D., M.D. Anderson Cancer Center and Benjamin A. Rybicki, Ph.D.
Henry Ford Health System
P30ES007784 and ES011126

Scientists have found a single nucleotide polymorphism that occurs in about five per cent of African-American men making them at greater risk for developing prostate cancer. This research was supported by NIEHS and the National Cancer Institute.

The study examined about one million single nucleotide polymorphisms across the genomes of 3,425 African-American men with prostate cancer and 3,290 African-American controls. The study is part of

the Multiethnic Cohort study being conducted in a collaborative effort between the Keck School and the University of Hawaii.

In general, men of African descent are more susceptible to prostate cancer than others. The current study reports the discovery of a prostate cancer marker on chromosome 17 and builds on a previous finding by the same research team which elucidated a marker on chromosome 8. These studies support the need for additional genome-wide association studies to locate markers which may play a role in understanding racial and ethnic health disparities.

Citation: Haiman CA, et al. Genome-wide association study of prostate cancer in men of African ancestry identifies a susceptibility locus at 17q21. Nat Genet. 2011 Jun;43(6):570-3.

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Caffeine and UVB Damage

Yu-Ying He, Ph.D.
University of Chicago
R01ES016936

According to recent findings from an NIEHS grantee at the University of Chicago, caffeine promotes UVB-apoptosis, or programmed cell death, of unrepaired keratinocytes thereby preventing carcinogenic transformation of the cells. Caffeine produces complex pharmacological actions and has been shown to be chemopreventive in non-melanoma skin cancer in humans and in mice.

These researchers investigated the molecular and cellular mechanisms involved in the pro-apoptotic effect of caffeine on UVB-irradiated HaCaT keratinocytes. Keratinocytes are the predominant cell type in the outermost layer of the skin. Pretreatment with caffeine increased UVB-induced apoptosis in the cultured keratinocytes. The experiments also showed that caffeine mediated to critical oncogenic pathways in skin tumorigenesis.

These findings build on previous work that demonstrated that coffee and regular exercise work together to kill off precancerous cells whose DNA has been damaged by UVB radiation.

Citation: Han W, Ming M, He YY. Caffeine Promotes Ultraviolet B-induced Apoptosis in Human Keratinocytes without Complete DNA Repair. J Biol Chem. 2011 Jul 1;286(26):22825-32.

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Prostate Cancer Risk Increased with Ambient Exposure to Pesticides

Beate Ritz, M.D., Ph.D.
University of California Los Angeles
Grants R01ES010544, U54ES012078, and P30ES007048

A new study from NIEHS-supported epidemiologists' finds that exposure to certain agricultural pesticides increase the risk of prostate cancer. This study adds to the mounting research that suggests insecticides, fungicides, and herbicides wreak havoc on the male endocrine system.

Exposure to methyl bromine and other organochlorine pesticides were associated with an up to two-fold increase in prostate cancer risk in the 173 men with prostate cancer in the study when compared to controls. Captan, a fungicide used widely on apple orchards in the US was associated with prostate cancer as well, but only at relatively high levels of exposure. The researchers conclude that efforts to

limit the dissemination of pesticide residues into the environment are not as protective as they need to be to limit human exposure.

According the study, the most likely reason for the increased risk is a complex interplay of genetics and the environment. The researchers speculate that only those men with a certain genotype will develop prostate cancer if they are exposed to pesticides. Preventing exposure by reducing the use of pesticides, increasing organic growing practices and other methods of limiting contact with pesticides would most likely prevent the disease from developing or progressing in these susceptible populations.
Citation: Cockburn M, Mills P, Zhang X, Zadmich J, Goldberg D, Ritz B. Prostate cancer and ambient pesticide exposure in agriculturally intensive areas in California. Am J Epidemiol, 2011 Jun 1;173(11):1280-8.

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Prenatal PAH Exposure Linked to Behavioral Problems in Kids
Frederica P. Perera, DrPH
Columbia University
P01ES009600 and R01ES008977

Children of expectant mothers who are exposed during pregnancy to polycyclic aromatic hydrocarbons (PAH) are more likely to have behavioral problems as they grow and develop. This study, funded by NIEHS at the Columbia Center for Children's Environmental Health, examined 215 children enrolled at birth. Children with high levels of PAH-DNA adducts, a biomarker of exposure, had more symptoms of attention problems and anxiety at ages 5 and 7 than did children with lower exposure.

PAH exposure occurs as a result of the incomplete combustion of fossil fuels and other organic material. These pollutants cross the placenta during pregnancy and bind to the DNA of the fetus. The researchers measured PAH-DNA adducts in white blood cells from umbilical cord blood samples taken at birth. A few years later, their mothers completed a detailed behavioral assessment of each child.

This study is the first to link behavioral effects with prenatal exposure to air pollution. The results are concerning since attention problems and anxiety may effect subsequent academic performance and social well-being.

Citation: Perera FP, Wang S, Vishnevetsky J, Zhang B, Cole KJ, Tang D, Rauh V, Phillips DH. PAH/Aromatic DNA Adducts in Cord Blood and Behavior Scores in New York City Children. Environ Health Perspect. 2011 Apr 4. [Epub ahead of print].

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Breakfast Helps to Reduce Childhood Lead Poisoning
Jianghong Liu, Ph.D.
University of Pennsylvania
K01ES015877, P30ES013508, and R01ES018858

A first-of-its-kind study of 1,344 children in Jintan, China reports that children who eat breakfast regularly have a blood lead content about 15% lower than children who do not. These results are consistent with previous studies in adults which demonstrated that fasting increases lead absorption from the gut.

The participants took part in the China Jintan Child Cohort Study, which is funded by a grant from NIEHS to the University of Pennsylvania. Children were enrolled in the study in 2004-2005 when they were three to five years-old. Their parents filled out questionnaires regarding their eating habits and foods they frequently ate.

The study compared blood lead levels to social factors, eating patterns, and intake of trace minerals and other micronutrients. There were no gender or age differences in breakfast consumption, but there was a marked decrease in blood lead concentration for children who ate breakfast regularly, which was defined as 5 days per week. The children who ate breakfast regularly had an average blood lead level of 6.1 micrograms/deciliter as compared to 7.2 micrograms/deciliter for those that ate breakfast irregularly.

Citation: Liu J, McCauley L, Compher C, Yan C, Shen X, Needleman H, Pinto-Martin JA. Regular breakfast and blood lead levels among preschool children. Environ Health. 2011 Apr 1;10:28.

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Endoplasmic Reticulum Stress in Obesity
Suneng Fu, Ph.D.
Harvard School of Public Health
T32ES007155

NIEHS-supported scientists at the Harvard School of Public Health report in *Nature* that abnormal lipid and calcium metabolism are important contributors to endoplasmic reticulum (ER) stress accompanying obesity. These findings suggest that interventions that modulate lipid synthesis or calcium homeostasis might represent new opportunities for obesity, insulin-resistance, and diabetes.

The ER is the main site of a variety of cellular processes including protein and lipid synthesis, xenobiotic metabolism and calcium storage. Disturbances in ER homeostasis can lead to stress and the subsequent activation of the unfolded protein response. Chronic ER stress is known to be important in the development of insulin resistance and diabetes in obese individuals; however the mechanisms responsible are not well understood.

These investigators compared the proteomic and lipidomic signatures of endoplasmic reticuli purified from the livers of obese and normal sized mice. They observed suppression of protein synthesis and stimulation of lipid synthesis in the ER from the obese mice. Alterations in the fatty acid and fat composition resulted in changes in calcium ATPase activity. They also discovered that correcting the obesity-induced changes in ER phospholipid make-up reduced chronic ER stress and improved glucose homeostasis.

Citation: Fu S, Yang L, Li P, Hofmann O, Dicker L, Hide W, Lin X, Watkins SM, Ivanov AR, Hotamisligil GS. Aberrant lipid metabolism disrupts calcium homeostasis causing liver endoplasmic reticulum stress in obesity. Nature. 2011 May 26;473(7348):528-31.

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Astrocytes and Microglia Display Distinct Sensitivities to Methylmercury
Michael Aschner, Ph.D.
Vanderbilt University School of Medicine
R01ES007331

In the first study to compare responses in microglia and astrocytes, the two major forms of glial cells that provide support for neurons in the central nervous system, NIEHS-supported scientists have determined that they react very differently to methyl mercury exposure. These findings could be important in the identification and development of therapies to reduce methyl mercury-induced damage to the central nervous system.

Microglia and astrocytes have both been identified as primary targets for the damaging effects of methyl mercury. This study was carried out in primary cell cultures of the two cell types to determine their responses to methyl mercury exposure with particular attention paid to cell viability, the generation of reactive oxygen species, mercury uptake, and glutathione levels.

The experimental results show that microglia are more sensitive methyl mercury than astrocytes and they have higher uptake of mercury and lower glutathione levels important in detoxifying reactive oxygen species. Microglia exhibited greater oxidative stress responses to methyl mercury exposure than did astrocytes. This study furthers our understanding of how these cell types respond to environmental insults.

Citation: Ni M, Li X, Yin Z, Sidoryk-Węgrzynowicz M, Jiang H, Farina M, Rocha JB,Syversen T, Aschner M. Comparative study on the response of rat primary
astrocytes and microglia to methylmercury toxicity. Glia. 2011 May;59(5):810-20.

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Water Purifier Harnesses Nanotechnology

Sylvia Daunert, Ph.D., Leonidas Bachas, Ph.D. and Dibakar Bhattacharyya, Ph.D.
University of Kentucky
P42ES007380

Scientists at the University of Kentucky, with support from the NIEHS Superfund Research Program, have invented a water purifier that degrades chemical toxins without the addition of acids or other harmful chemicals. The device employs nanotechnology to generate hydroxyl radicals and could be used to provide safe, clean drinking water for the developing world and the U.S.

Two-thirds of all hazardous waste sites in the U.S. are contaminated with trichloroethylene (TCE). Along with trichlorophenol, TCE is responsible for drinking water contamination in much of the world. To remove these chemicals from drinking water is costly and requires the use of acids and other hazardous chemicals in large amounts. The Kentucky investigators first mix glucose with contaminated water and then let it pass through a nanostructured membrane embedded with glucose oxidase, an enzyme that produces hydrogen peroxide from glucose. A second membrane containing iron trapped in an acidic matrix converts the peroxide into hydroxyl radicals which interact with and destroy the organic pollutants.

The investigators are currently filing for patents for the technology. The device could represent a major step forward in providing clean drinking water inexpensively in areas of the world where chemical contamination is prevalent.

Citation: Lewis SR, Datta S, Gui M, Coker EL, Huggins FE, Daunert S, Bachas L,
Bhattacharyya D. Reactive nanostructured membranes for water purification. Proc Natl Acad Sci U S A. 2011 May 24;108(21):8577-82.

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Elevated Blood Levels of Flame Retardants in Mexican-American Children
Brenda Eskenazi, Ph.D., Asa Bradman, Ph.D., and Nina Holland, Ph.D.
University of California Berkeley
P01ES009605 and R01ES012503

Epidemiologists at the University of California Berkeley report that levels of flame retardants are seven times higher in Mexican-American children living in California than children in Mexico. They report that levels of the chemicals, polybrominated diphenyl ethers or PBDEs, are higher in these children than almost all other groups of children ever studied.

PBDEs are used in a variety of products including padding in upholstered furniture, carpet pads, child car seats, mattresses, and clothing. Some of these products have been reported to contain as much as fifty percent of the chemicals by weight and they tend to have long lifespans. PBDEs do not bind chemically to the products they are used in. As the products age and degrade, the chemicals are released in the form of dusts. California has very high anti-flammability standards; these could have inadvertently led to high levels of PBDE-laden dusts in homes.

Prior research suggests that exposure to PBDEs is linked to infertility problems and thyroid hormone imbalances. The levels reported in this study represent a major challenge to California public health officials.

Citation: Eskenazi B, Fenster L, Castorina R, Marks AR, Sjödin A, Rosas LG, Holland N, Guerra AG, López-Carrillo L, Bradman A. A Comparison of PBDE Serum Concentrations in Mexican and Mexican-American Children Living in California. Environ Health Perspect. 2011 Apr 15. [Epub ahead of print]

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Ah Receptor Activation Delays Development of Chemical-Induced Mammary Tumors
Beth A. Vorderstrasse, Ph.D.
Washington State University
R21ES014422

In a somewhat surprising finding, NIEHS-supported investigators report that exposure to tetrachlorodibenzo-p-dioxin (TCDD) prior to exposure to the known mammary tumor promoter dimethylbenz[a]anthracdene (DMBA) delays the development of breast cancer in mice and produces a lower overall incidence of breast tumors. The researchers conclude that the effect is caused by activation of the Ah receptor by TCDD.

The Ah receptor has been studied extensively because of its role in the toxic effects of dioxin-like compounds. However, recently there have been numerous reports that the receptor is involved in normal development, carcinogenesis, and cell cycle regulation.

Previous work has suggested that exposure to TCDD during pregnancy causes impaired mammary gland growth and development. Normal pregnancy-induced mammary differentiation has been shown to be protective against breast cancer. The investigators' initial hypothesis was that TCDD exposure would make the mice more susceptible to DMBA-induced tumor development.

In both pregnant and non-pregnant mice, TCDD treatment prior to exposure to DMBA caused a four-week delay in tumor formation and a lower tumor incidence through-out the six month study. No

markers for tumor initiation differed between TCCD-treated and control mice. These findings suggest that Ah receptor activation causes the delay in tumor formation and could provide an opportunity for possible therapeutic interventions.

Citation: Wang T, Gavin HM, Arlt VM, Lawrence BP, Fenton SE, Medina D, Vorderstrasse BA.Aryl hydrocarbon receptor activation during pregnancy, and in adult nulliparous mice, delays the subsequent development of DMBA-induced mammary tumors. Int J Cancer. 2011 Apr 1;128(7):1509-23.

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Risk of Bladder Cancer Higher in Diabetics

Margaret R. Karagas, Ph.D.
Dartmouth Medical School
P42ES007373

Superfund Research Program grantees at Dartmouth Medical School report that a history of diabetes and taking oral medications for diabetes significantly increase a person's risk for developing bladder cancer. These findings are based on a case-control study in New Hampshire including approximately 600 people.

Recent research has demonstrated a link between diabetes and bladder cancer; however these studies did not consider the type or duration of diabetic therapy. The current study found that diabetics were more than twice as likely to develop bladder cancer as matched control. The association was even stronger in diabetics with a long-standing history of the disease of more than 16 years. Their risk was more 3½ times higher. Diabetics with a history of taking oral hypoglycemic medications were at more than three times greater risk for bladder cancer.

The researchers point out that their study was limited by their inability to differentiate between Type 1 and Type 2 diabetics. They conclude that more research is needed to determine the weighted effects of duration of diabetes and medication type on the risk of bladder cancer.

Citation: MacKenzie T, Zens MS, Ferrara A, Schned A, Karagas MR. Diabetes and risk of bladder cancer: evidence from a case-control study in New England. Cancer. 2011 Apr 1;117(7):1552-6.

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Beijing Olympics Pollution Controls Could Save Lives

Staci L. Massey Simonich, Ph.D., Dave Stone, Ph.D., and Shu Tao, Ph.D.
Oregon State University
P30ES000210 and P42ES016465

A study supported by the NIEHS Superfund Research Program finds that the air pollution control measures put in place in Beijing during the 2008 Olympic Games would cut the lifetime risk of lung cancer almost in half. If the controls were continued, polycyclic aromatic hydrocarbon (PAH) pollution would drop dramatically and could translate to about 10,000 fewer lifetime cases of lung cancer. Beijing is only one of several large metropolitan areas in China that have unhealthy levels of air pollution, largely from the burning of coal, biomass and automobile exhaust in a rapidly growing economy.

The findings were published by researchers from Oregon State University and Peking University in Beijing. This is one of the first efforts to actually study the health benefits of pollution control strategies in a Chinese population. The research looked at the chemical composition and carcinogenic impact of a range of PAH compounds that result from almost any type of combustion, ranging from wood burning stoves to coal-fired power plants or automobile exhaust. The research found that in Beijing, a

metropolitan area with 22 million people, the existing level of PAH pollution would lead to about 21,200 lifetime cases of lung cancer, but that would drop to 11,400 cases if pollution controls similar to those imposed during the 2008 Olympics were sustained.

Other OSU research has also found that the level of pollutants in some Asian nations is now so high that PAH compounds are crossing the Pacific Ocean and being deposited in the U.S. China is now the leading emitter of PAH pollutants in the world. According to the study "PAH pollution was definitely reduced by the actions China took during the 2008 Olympics, such as restricting vehicle use, decreasing coal combustion and closing some pollution-emitting factories."

Some, but not all, of the steps taken during the Olympics have been continued; however, the number of vehicles in Beijing, for instance, is continuing to increase 13 percent a year, the report noted. "Controlling vehicle emissions is key to reducing the inhalation cancer risks due to PAH exposure in Chinese megacities," the researchers wrote in their study.

Citation: Jia Y, Stone D, Wang W, Schrlau J, Tao S, Massey Simonich SL 2011. Estimated reduction in cancer risk due to PAH exposures if source control measures during the 2008 Beijing Olympics were sustained. Environ Health Perspect:-. doi:10.1289/ehp.1003100

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Amyloid-Binding Compound Extends Lifespan in *C. Elegans*

Gordon J. Lithgow, Ph.D.
The Buck Institute for Age Research
RL1ES016655

NIEHS supported-researchers at the Buck Institute for Age Research report that a chemical dye that lights up amyloid protein clumps characteristic of Alzheimer's disease also slows aging in the nematode, *C. elegans*. The lifespan-boosting effects of the dye — called Thioflavin T or Basic Yellow 1 — support the idea that the build-up of misshapen proteins is one of the fundamental events in the aging process. Drugs that stimulate the cell's natural repair and protein-recycling systems could be used to treat diseases of old age.

Misfolded proteins don't function properly and tend to accumulate and gum up other cellular systems. Worms genetically engineered to have a revved-up protein-recycling system, for instance, live longer than normal worms.

The study results show that small doses of Thioflavin T boosted the lifespan of roundworms by as much as 78%. Worms that did not receive the dye were all dead within 20 days, yet more than 80% of worms consuming a diet that included an optimum dose of Thioflavin T were still alive after the same period. Thioflavin T proved toxic at higher doses and shortened the worms' lives considerably.

The study authors suspect that Thioflavin T boost life spans by recognizing all kinds of toxic protein clumps. The dye reversed the effects of mutations that cause muscle proteins to misfold, and to become paralysed at a particular temperature. The team also found that worms that lack genes important to dealing with misshapen proteins do not live longer when fed Thioflavin T.

Citation: Alavez S, Vantipalli MC, Zucker DJ, Klang IM, Lithgow GJ. Amyloid-binding compounds maintain protein homeostasis during ageing and extend lifespan. Nature. 2011 Apr 14;472(7342):226-9.

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Study Finds No Link between Mercury Exposure and Cardiovascular Disease
Dariush Mozaffarian, M.D., M.P.H. and Philippe A. Grandjean, M.D., Ph.D.
Harvard School of Public Health
R01ES014433 and R01ES013692

New research findings published by NIEHS grantees at the Harvard School of Public Health show no evidence that higher levels of mercury exposure are associated with higher risk for cardiovascular disease or stroke. Previous research has shown the beneficial cardiovascular effects of eating fish rich in omega-3 fatty acids, but other studies suggested that mercury exposure from fish consumption may be linked to higher risk of cardiovascular diseases. The current findings may allay those fears.

The researchers analyzed data from two studies which included more than 170,000 men and women. Participants in both groups have answered questions every two years about their medical history, risk factors, disease incidence, and lifestyle. For the current analysis, the researchers measured mercury concentrations in stored toenail clippings in nearly 7,000 participants who did and did not experience a cardiovascular event during follow-up. Toenail mercury concentrations are an excellent biomarker of long-term mercury exposure. The researchers identified 3,427 new cases of coronary heart disease and stroke and matched them to 3,427 randomly chosen participants free of cardiovascular disease during follow-up.

After adjusting for age, gender, and other cardiovascular disease risk factors, the researchers found no association between mercury exposure and higher risk of cardiovascular disease. Trends toward lower risk with higher mercury levels were actually seen, which the researchers attribute to other beneficial effects of fish consumption.

Citation: Mozaffarian D, Shi P, Morris JS, Spiegelman D, Grandjean P, Siscovick DS, Willett WC, Rimm EB. Mercury exposure and risk of cardiovascular disease in two U.S. cohorts. N Engl J Med. 2011 Mar 24;364(12):1116-25.

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Mitochondrial, but not Nuclear Ligase3 is Required for Cellular Viability
Bennett Van Houten, Ph.D., University of Pittsburgh
NIEHS Grant R01ES19566

A multi-institutional team of scientists including former NIEHS Principal Investigator, Ben Van Houten, has determined that mitochondrial DNA ligase3 (Lig3), an enzyme involved in various DNA repair pathways, is necessary for cellular growth and viability as compared to the nuclear version of the enzyme. These findings were made through a series of exquisite experiments which incorporated various forms of the gene coding for Lig3 in mouse embryonic stem cells.

Previous research has demonstrated the importance of the nuclear complex of Lig3 and its partner protein Xrcc-1 in DNA single-strand break repair. The full characterization of Lig3 has been hampered by the fact that deletion of its gene is embryonically lethal in mice. In the current studies, the investigators introduced various forms of Lig3 into mouse embryonic stem cells containing a conditional allele for Lig3 that could be deleted with Cre recombinase. This approach enabled them to determine that mitochondrial Lig3, but not nuclear, is necessary for cell viability. They also found that substitution of Lig1for Lig3in the mitochondria maintains cellular viability.

Citation: Simsek D, Furda A, Gao Y, Artus J, Brunet E, Hadjantonakis AK, Van Houten B, Shuman S, McKinnon PJ, Jasin M. Crucial role for DNA ligase III in mitochondria but not in Xrcc1-dependent repair. Nature. 2011 Mar 10;471(7337):245-8.

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PAPERS by DERT STAFF

Padilla-Carlin DJ, Schladweiler MC, Shannahan JH, Kodavanti UP, Nyska A, Burgoon LD, Gavett SH. Pulmonary inflammatory and fibrotic responses in Fischer 344 rats after intratracheal instillation exposure to libby amphibole. J Toxicol Environ Health A. 2011 Sep 1;74(17):1111-32.

GRANTEE HONORS and AWARDS

The Bay Area Breast Cancer and the Environment Research Center (BABCERC), based at the University of California, San Francisco (UCSF), under the leadership of *Dr. Robert A. Hiatt*, has been honored with an Award of Distinction by The International Academy of the Visual Arts for the video "The Breast Biologues: A biology dialogue about breast cancer and the environment." The Award of Distinction is one of the communication awards and is presented for projects that exceed industry standards in quality and achievement.

The *Breast Biologues* video tells a story of scientific discovery about breast cancer and the environment that is relevant, timely and actionable. The video is part of an education kit that also includes a comic book available in English and Spanish. The Breast Biologues is the direct result of research by scientists at two Bay Area institutions, University of California San Francisco and Lawrence Berkeley National Lab, who have collaborated over the past seven years in the Center. As leader of the Center's community outreach project, Zero Breast Cancer is charged with integrating the community's interests and concerns into the research agenda and with disseminating and explaining research findings to the community at large. The BABCERC includes a basic science study, an epidemiology study, and the community outreach and translation core. It is a collaborative project involving UCSF, Kaiser Permanente Division of Research, California Department of Public Health and Zero Breast Cancer. More information about the BABCERC can be found on its web site: http://bayarea.bcerc.org. The BABCERC is one of four Breast Cancer and the Environment Research Centers jointly funded by NIEHS and the National Cancer Institute (http://www.niehs.nih.gov/research/supported/centers/breast-cancer/index.cfm). The centers are studying the impact of prenatal-to-adult environmental exposures that may predispose a woman to breast cancer.

Patricia Hoyer, Ph.D., University of Arizona, was honored with the 2011 Society for the Study of Reproduction (SSR) Trainee Mentoring Award, during the group's annual meeting July 31-Aug. 4 in Portland, Ore. Dr. Hoyer is a professor in the Department of Physiology in the College of Medicine and principal investigator at the University of Arizona Center for Toxicology and the Southwest Environmental Health Sciences Center.

Adam Spanier, M.D., Ph.D., M.P.H., Department of Pediatrics, Pennsylvania State University, Hershey Medical Center, was awarded the Academic Pediatric Association Michael Shannon Research Award at the Pediatric Academic Societies Meeting in Denver, Colorado, in May. The platform presentation analyzed the association of PBA exposure and wheeze. Dr. Spanier also won the Clinical Young Investigator Award at the Penn State Hershey Medical Center 5th Biennial Pediatric Research Day in

October, 2010. Dr. Spanier is supported by a K23 Mentored Patient Oriented Research Career Development Award from NIEHS, entitled “Prenatal Low Level Tobacco and Phthalate Exposure and Childhood Respiratory Health.”

Dr. Xianai Wu is a post-doctoral researcher at the University of Iowa, working with Dr. Larry Robertson and conducting studies on PCBs and their metabolites. For her six-week externship, she will conduct animal studies (with rats) at the University of California - Davis under the guidance of Dr. Bruce Hammock. She will evaluate the effects of PCB126 on vitamin D metabolites and oxylipins in blood and tissue samples using metabolomic techniques. These results will contribute to the effects of dietary intervention on PCB metabolism. She will be learning novel metabolomic techniques, which currently are not used in Dr. Robertson's laboratory. She will write a manuscript as a result of this externship.

Brown University SRP researcher *Dr. David Murray* recently received Save the Bay's Environmental Achievement Award at the organization's annual meeting, held May 19. Murray was honored for his water-quality research of the Providence and Seekonk rivers and the expertise he has lent to Save the Bay over the past decade. Save the Bay is a Providence, Rhode Island-based independent, not-for-profit organization committed to protecting, restoring, and improving the ecological health of the Narragansett Bay region of Rhode Island.

KC Donnelly Externship Awards

The Superfund Research Program is proud to announce the winners of the KC Donnelly Externship Awards. These awards are named in memory of Dr. KC Donnelly, a longtime SRP grantee. These are administrative supplements provided to current SRP-funded graduate students and post-doctoral researchers with translational/transdisciplinary opportunities and experiences within other SRP-funded centers, government laboratories (EPA, ATSDR, NIEHS), or other agencies (state, local, Tribal). The three winners include:

Celys Irizarry, a graduate student at the University of Puerto Rico-Mayagüez, through the Northeastern Superfund Research Program, currently working with Dr. Ingrid Padilla. For her three-month externship, she will conduct research at the Caribbean Environmental Protection Division of the U.S. Environmental Protection Agency and the Office of Drinking Water within the Puerto Rico Department of Health. She will collect water-quality data for chemicals (e.g., chlorinated volatile organic compounds, phthalates) that are suspected to be associated with pre-term birth. The data collected from this project will go toward the regulatory agencies' water-quality assessment models.

Dr. Alvine Mehinto is a post-doctoral researcher at the University of Florida, working with Dr. Nancy Denslow. For her three-month externship, she will combine/integrate "omics" data from her study of largemouth bass (at U Florida) and will conduct a similar study at the University of California - Berkeley with Dr. Chris Vulpe in a yeast model exposed to the same contaminants; this will allow her to gain better insight regarding each toxicant's pathways of toxicity. She will also learn how to conduct Dr. Vulpe's parallel deletion analysis (PDA) by testing it on Superfund chemicals, an emerging contaminant (Gulf oil), and a dispersant (Corexit 9215), and she will conduct the statistical analysis at UC - Berkeley. These results will contribute to the understanding of the underlying toxicity pathways that may occur in higher organisms. She will write two manuscripts as a result of this externship.

STAFF HONORS AND AWARDS

Dr. Heather Henry, CRIS, is one of 28 people who have been accepted into the inaugural NIH Mid-Level leadership Program. The NIH Mid-Level Leadership Program provides GS-12/13/14 and equivalent employees with the leadership skills and knowledge to aid them in effectively leading from both supervisory and non-supervisory positions. The Program emphasizes the leadership developmental areas of self-awareness and fulfilling the leadership function, understanding and collaborating with others, and strategic business acumen.

Superfund Research Program Director Dr. William Suk was honored by colleagues with the Adel Sarofim Award for Excellence in Combustion Research. Dr. Suk received the award at the 12th International Congress on Combustion By-Products and their Health Effects held June 5-8 at Zhejaiang University in Hanzhou, China.

The following DERT staff received awards at the 2011 Director's Awards Ceremony held Tuesday, August 2 at the Natcher Conference Center on the NIH Campus in Bethesda, Maryland.

As part of the Deepwater Horizon Gulf Oil Spill Team *Mr. Joseph (Chip) Hughes, Mr. Ted Outwater, Mr. Jim Remington, Mrs. Sharon Beard and Ms. Kathy Ahlmark, CRIS; Dr. Gwen Collman, DERT/OD; Dorothy Duke, GMB; Dr. Leroy Worth, SRB; and Dr. Claudia Thompson, SPHB,* received an NIH Director's Award "For the 2010 Gulf Oil Spill response, implementing public health protection programs for cleanup workers, developing the gulf Study and assembling a research consortium." NIH Directors Award recognizes superior performance or special efforts significantly beyond the regular duty requirements, and directly related to fulfilling the mission of the national Institutes of Health. The Gulf Team received an award in the Scientific/Medical category. The Team included many NIEHS staff including Dr. Linda Birnbaum. A separate award was given to the "Gulf Long-term Followup (GuLF) Study" team.

Ms. Martha Barnes, PAB, as part of the PROMIS Working Group, received a Common Fund Leadership Award "For outstanding efforts in promoting the use of NIH Patient Reported Outcomes Measurement Information System (PROMIS) tools in clinical research." The NIH Common fund supports trans-NIH research initiatives that NIH as a whole must address to ensure both efficient and effective scientific discovery. The NIH Director's Common Fund Leadership award is given to individuals and/or groups who have demonstrated significant leadership, skill and ability in contributing to the planning, implementation, and evaluation of Common Fund initiatives. It was initiated to give formal appreciation and encouragement to those individuals who are both officially and voluntarily giving of their expertise and time in contributing to this agency-wide effort.

STAFF ACTIVITIES

NIEHS/WETP cosponsored the *2011 Environmental Justice (EJ) Conference: One Community – One Environment* with the Environmental Protection Agency (EPA) and the EPA's Offices of Air and Radiation (OAR), Water (OW), Solid Waste and Emergency Response (OSWER), Research and Development (ORD); and the Greendoor Initiative (Detroit-based organization). This conference was held August 23-26 at the Detroit Marriott Renaissance Center in Detroit, Michigan. Topics addressed included: Community Capacity, Strategies for Addressing Pollutions Sources that Impact EJ Communities, Federal Interagency Working Group on EJ, Environmental Workforce Development Training and Job Creation, Updates: Federal Agencies' Priorities for EJ, Hands-on Demonstrations of Tools & Resources, Funding Opportunities, and Title VI , Human Rights, Delegation Agreements and other Tools for Accountability. *Mr. Hughes, Mr. Outwater, and Mrs. Beard, WETP*, attended the meeting.

Dr. Chadwick, SPHB, attended the Epigenetics Gordon Research Conference, August 7-11 in Easton, Massachusetts. Dr. Chadwick presented an overview of the data and resources available through the NIH Roadmap Epigenomics Program.

The Superfund Research Program staff celebrated the publication of its 200th Research Brief on August 3rd. To commemorate the event it produced a special 4-pager compendium, highlighting the last 100 Briefs. See: http://tools.niehs.nih.gov/srp/1/ResearchBriefs/pdfs/SRP_ResearchBrief_200.pdf

Dr. Balshaw, CRIS, participated in a panel discussion focused on the needs of the research community at the National Academy of Sciences Committee on Emerging Technologies for Environmental Health Decisions workshop on Complex Mixtures on July 27-18.

Mr. Hughes and Mrs. Beard, WETP helped to organize, present and actively engage in the HHS Environmental Justice Thought Leaders Meeting to obtain feedback from stakeholders to update the 1995 HHS EJ Strategy in Washington D.C. on Friday, July 22. Mr. Hughes provided an overview, including new approaches and emphasis areas, of the Public Education and Training areas and Mrs. Beard did the same for the Research area of the HHS Strategic Plan.

Dr. Shreffler, COSPB, who is the overall coordinator of the Outstanding New Environmental Health Scientists (ONES) Program, organized a two day grantee forum, which was held July 18-19 in the Rodbell Auditorium on the NIEHS campus in Research Triangle Park, North Carolina. The 35 awardees from the first five year period of the award, 2006-2010, were invited to NIEHS to present their research to the Institute. The program included platform presentations and a poster session to allow more individual interaction with the awardees. The agenda included sessions on Pulmonary Disease and Environmental Exposures, Cardiovascular Responses to the Environment, Fibrotic Responses to the Environment, Mechanisms in Nanotoxicology, Mechanisms in Neurotoxicology, Effects of Arsenic Exposure, Endocrine Acting Chemical Responses, and Mechanisms of Mutagenesis, Carcinogenesis, and DNA Repair. On Tuesday over lunch an open forum with the Director, DERT, Deputy Director, DERT, and DERT Program and Review Officers was held to discuss challenges and successes of the ONES program, and issues surrounding CSR study section reviews.

Ms. Anderson, SRP/CRIS, was invited to present at the EPA Community Involvement managers meeting on Superfund Monday, July 18, 2001. She called upon three SRP grantees to assist her in directing in an interactive discussion regarding tools needed to improve lines of communication between the SRP community engagement initiatives and the EPA Superfund community engagement activities.

Mr. O'Fallon, SPHB, and Ms. Anderson, CRIS, organized a Partnerships for Environmental Public Health (PEPH) Workshop titled, "Environmental Health Communication; Methods, Research and Training," that was convened at the Natcher Convention Center on the NIH Campus in Bethesda, Maryland, on July 14th. Communication and capacity building are central components to the PEPH Program. Within PEPH, grantees have developed many different communication approaches and materials, as well as a variety of training strategies to build the capacity of researchers, community groups, educators and health care professionals to communicate environmental health messages more effectively. The purpose of the meeting was to provide a venue for PEPH grantees and partners to have small group discussions on and learn about common strategies used to build the capacity of researchers, community groups, educators and health care professionals. We had 60 participants from PEPH projects and Federal partners (NCI & NLM). Some of the common themes that emerged from the meeting were the importance of language (e.g., "Bench to Public Health"); communicating early and often; providing messages that are actionable; the importance of trust, transparency, open and personalized messages; timing – i.e.,

understand researcher and community perspectives; the need to embrace technology in messaging (mobile, social media etc.) ; the importance of Transdisciplinary partnerships that include communication experts, data providers, behavioral and social scientists; evaluators etc.; the need for research on communication; closing the gap between "Environment" and "Health" – within the context of science education and healthcare professional development; and the need for metric s in order to measure communication outcomes. The feedback from participants was very positive. We are working on a final meeting summary. *Drs. Thompson, Dilworth and Reinlib, SPHB*, also attended.

Mr. Remington, WETP attended and presented on NIEHS WETP training initiatives at the Society of Public Health Educators (SOPHE) conference on July 13-14 in Atlanta, Georgia.

Mr. Hughes and Mrs. Beard, WETP have been actively involved in the HHS Environmental Justice (EJ) Strategic Planning Committee Meetings to develop the HHS EJ Strategic Plan, and are involved with planning HHS participation in EJ Listening Sessions across the U.S. These listening sessions can be found at the Interagency Working Group on Environmental Justice Listening Sessions. Mr. Hughes, Mrs. Beard and *Mr. O'Fallon, SPHB*, are on the EJ Accomplishments Working Group. Mr. O'Fallon is the Leader of this group and has developed a draft template to collect the accomplishments that each agency and institute within HHS will use to provide their top five EJ accomplishments. Mrs. Beard is the co-lead with Sandra Howard, HHS Office of the Assistant Secretary for Planning and Evaluation, for HHS on the Federal Interagency Working Group to develop the template for each Federal Department to submit their EJ Strategic Plan. They worked with Charles Lee at EPA to develop the template, and are compiling comments from HHS and the other Federal Partners. There is also a Stakeholder Involvement Working Group for HHS where plans are being developed to gather stakeholder comments on the HHS EJ Strategic Plan.

Dr. Suk, SRP/CRIS Program Director, traveled to Bangkok, Thailand June 24-27 and July 4 – 7, where he attended a meeting advising Her Royal Highness on aspects of the agenda for her upcoming Congress to be held in Bangkok, Thailand, in November; reviewed, in-depth, a Ph.D. student's project and attended a progress report meeting; participated in a series of lectures to pre- and post-doctoral students from the SE Asia region as well as others. Dr. Suk also participated in the planning of critical research, education and training activities directly related to linking environmental exposure and human health and disease.

Dr. Humble, COSPB, gave a welcoming address and overview presentation on the NIH and NIEHS to 20 visiting students participating in the Duke Chemistry Summer Undergraduate Fellowship Program and the NSF-funded Research Experience for Undergraduates (REU) program, hosted on the Duke University campus. The NSF/REU participants are undergraduates from all over the east coast, and all are majoring in Chemistry or Biochemistry. The students visited the NIEHS on Thursday morning, June 30.

Dr. Thompson, SPHB/ SRP Science advisor, participated in a series of meetings regarding arsenic exposures and disease etiology at the Chulabhorn Research Institute (CRI), Bangkok, Thailand June 24-27.
Dr. Heindel, COSPB, attended a Green Chemistry workshop sponsored by the Green Chemistry Institute at Yale in Washington DC June 24th. The goal of the meeting was to develop computational and QSAR models to predict toxicity of new chemicals during their development.

Dr. Schug, COSPB, participated in the "15th Annual Green Chemistry & Engineering Conference" held June 21-23, in Washington, D.C. Dr. Schug gave a presentation tilted, "Designing endocrine disruption out of the next generation of material", during the Environmental Health Science session. He also

participated in a panel discussion on developing practical tools for green chemists to identify potential endocrine hazards in new molecules.

Ms. Anderson, CRIS/SRP, in coordination with EPA colleagues, developed Memorandum of Understanding (MOU) that formalized the long-standing partnership between the Superfund Research Program and EPA Superfund Office. The MOU highlights commitments to many approaches that are being used to foster ongoing communication, coordination and collaboration between the two groups. The official document was signed by Dr. Linda Birnbaum and Mr. James Woolford of EPA in June.

Dr. Humble, COSPB, gave a welcoming address and overview presentation on the NIH and NIEHS to 50 visiting undergraduates from the University of North Carolina at Chapel Hill, Friday, June 17. These students are participating in the Science Enrichment Preparation (SEP) program, a part of the NC Health Careers Access Program (NCHCAP) at UNC, and were visiting to find out more about the mission, research, and goals of the NIEHS, as well as career possibilities in environmental health sciences.

Drs. Nadadur, Heindel and Schug, COSPB, participated in the NIEHS Centers for Nanotechnology Health Implications Research (NCNHIR) Consortium Meeting, which was held in Seattle, WA, June 15-16. This was the second official meeting of the consortium, which served to cover both research progress updates and a meeting of the Steering Committee.

Dr. Humble, COSPB, was a participant in the EPA-NIEHS Climate Change Workshop for High School Students, June 13-17. Mike was one of seven NIEHS or EPA scientists participating on a career discussion panel. Approximately 25 high school students from the Durham public school system participated in the weeklong workshop, along with 30 NIEHS and EPA employees.

Mr. Remington, WETP participated as a Subject Matter Expert in Hazmat Disaster Preparedness Training on the InterAgency Board's Training and Exercise Work Group that was held in Seattle, Washington, June 7-8.

Drs. Suk and Carlin, SRP/CRIS, attended the 12th International Congress on Combustion By-Products and Their Health Effects: Combustion Engineering and Global Health in the 21st Century - Issues and Challenges, June 5-8, at Zhejiang University in Hangzhou, China. Dr. Carlin co-chaired the session with Dr. Stephania Cormier (Louisiana State University) entitled “Impact of Air Pollution on Cardiovascular and Pulmonary Disease” which included talks about impact of air pollution on cardiovascular and pulmonary disease, particularly the role of environmentally persistent free radicals. Drs. Carlin and Suk also participated in the meeting’s expert panel, comprised of staff from NIEHS, EPA, industry, and academia as well as other meeting participants. This conference was jointly sponsored by NIEHS Superfund Research Program (SRP) by way of a conference supplement to Louisiana State University’s P42 grant (Center Director: Barry Dellinger).

Dr. Henry, SRP/CRIS, attended Sustainable Remediation 2011: State of the Practice on June 1-3 at the University of Massachusetts in Amherst.
Dr. Heindel, COSPB, presented the overview lecture and closing remarks at a symposium sponsored by an NIEHS R13 (Nira Ben Jonathon PI) grant and a grant from Passport Foundation. The symposium titled, “Role of Environmental Chemical Exposure in the Etiology of Obesity, Type 2 Diabetes and Metabolic Syndrome” was held as a satellite symposium to the European Obesity Society Annual meeting in Istanbul Turkey on May 24th.

Ms. Anderson, and Drs. Henry and Carlin, SRP/CRIS, attended the annual meeting of the National Association of Remedial Project Managers, which was held May 16-20 in Kansas City, Missouri. Ms. Anderson organized and chaired two sessions: Working Together: Getting the Best Results through Partnerships Panel Session and Passive Samplers to Determine Bioavailability and Toxicity of Contaminated Sediments Panel Session. Dr. Henry chaired a session on Cutting Edge and Innovative Practices and Research. All three sessions featured SRP grantees.

Dr. Henry, SRP/CRIS, organized and hosted the Spring/Summer 2011 Risk e-Learning webinar series titled Community Engagement: New Approaches and Success Stories (http://www.niehs.nih.gov/research/supported/srp/events/riskelearning/communityengagement.cfm). The series highlighted the importance of engaging communities in bi-directional partnerships to effectively communicate the risks of environmental exposures to hazardous substances. It featured presentations by SRP grantees and EPA colleagues engaged in working with communities.

Mrs. Beard, WETP, attended a professional development course and sessions at the *2011 American Industrial Hygiene Conference and Exposition* in Portland, Oregon, on May 14-19. In addition, Mrs. Beard presented along with Evan Dunne, Acting Director, Safety Training Program, DOE National Training Center (HS-70) at the US Department of Energy (DOE) and DOE Contractors Industrial Hygiene Meeting in conjunction with the 2011 American Industrial Hygiene Conference and Exposition on Monday, May 16, on the DOE/NIEHS Safety Training Collaboration Initiative. The U.S. DOE Office of Health, Safety and Security (HSS) and the NIEHS teamed to establish a model for collaborative safety training workshops across DOE operating sites. The objective of these collaborative workshops was to identify areas and topics where HSS, the NIEHS, and grantees under the NIEHS Worker Education & Training Program's DOE Nuclear Weapons Cleanup Training Program could work collaboratively with the DOE site programs to enhance the safety of site operations through training. During this presentation each party described this partnership and the role of each organization in this intuitive. In addition, they shared the results of the workshops, gathered feedback from the attendees of the DOE Contractor meeting and discussed next steps.

Mr. Remington, WETP along with the International Association of Firefighters debriefed members of Virginia's Task Force 1 Urban Search and Rescue team in Fairfax, Virginia on May 13th regarding their deployments following the earthquakes in Japan and Haiti with the purpose of improving responder health and safety preparedness training.

Mrs. Beard, WETP, participated in the National Review Panel of the US EPA *Environmental Workforce Development and Job Training Grants* on May 9-11 in Milwaukee, Wisconsin.

NIEHS/WETP held its spring grantee meeting and technical workshop May 3-5 at the Renaissance Mobile Riverview Plaza Hotel in Mobile, Alabama. This meeting, *Deepwater Horizon Lessons Learned Workshop: Improving Safety and Health Training for Disaster Cleanup Workers*, examined the training-related Deepwater Horizon Oil response activities and discussed the proper elements of pre-incident and deployment-phase training for support personnel performing cleanup work. In addition, policies to best ensure that workers receive that training (in a language and a literacy level they understand) before being deployed to work were explored.

Mr. Remington, WETP, coordinated with the Kentucky Office of Homeland Security and local Worker Education and Training grantees to provide earthquake hazard awareness training to approximately 35 members of the state's Community Emergency Response Teams in preparation of activities under the National Level Exercise in Gilbertsville, Kentucky on April 30th.

UPCOMING MEETINGS and WORKSHOPS

The "***Engaging Communities to Advance Environmental Health Policy***" meeting will be held September 7-8 in Iowa City, Iowa. This two-day event will promote shared discussions on community and policy maker engagement in environmental health and environmental justice. The meeting consists of three inter-related parts: The Partnerships for Environmental Public Health (PEPH) Workshop will focus on engaging policy makers. The Hansen Award, which will honor former NIEHS Director, Kenneth Olden, will focus on engaging communities. The Federal Interagency Working Group EJ Listening Session will engage meeting participants in identifying rural EJ issues. Mr. Liam O'Fallon and Ms. Beth Anderson are organizing this event in coordination with the University of Iowa, College of Public Health, which is hosting its annual Hansen Award. In addition, Mr. O'Fallon and Ms. Anderson are coordinating with Nadine Gracia (HHS) to convene the EJ Listening session as part of the overall meeting. More information can be found about this meeting at http://1.usa.gov/PEPH-Iowa2.

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The NIEHS is sponsoring a workshop, "***NIEHS Workshop to Examine the Interactions between Environmental Exposures and Infectious Agents in the Etiology of Human Disease***," to examine interactions between environmental exposures and infectious agents and their role in the etiology of human disease. The workshop will be held in the Rodbell Auditorium on September 8-9. The workshop will bring together experts in the field to discuss the relationship and interactions between environmental exposures and infectious vectors (viruses, bacteria, fungi, parasites). The workshop will consist of four sessions: 1) How do environmental toxicants modify responses to pathogens? 2) How do pathogen exposures modify the health effects or responses to environmental toxicants? 3) The environment and the emergence/re-emergence of infectious disease and 4) How do toxicants and pathogens synergize in disease processes? Each session will consist of presentations from invited speakers and a follow-up panel discussion. The goal of the workshop is to utilize the input and expertise of the invited participants to determine the most appropriate and productive directions for future research announcements and opportunities, and to establish a cohesive long term research agenda to improve human health through the development of intervention and prevention strategies and new therapeutics. The meeting is open to the public. Meeting information and registration can be found on the following website: http://tools.niehs.nih.gov/conferences/dert/workshop_env_exp/.

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NIEHS/WETP will be holding its fall grantee meeting in conjunction with ***the* Eliminating Health and Safety Disparities at Work conference *with NIOSH, OSHA, and EPA*** on September 13-15 at the Doubletree by Hilton Hotel Chicago- Magnificent Mile in Chicago, Illinois. The purpose of the workshop is to bring together representatives from multiple disciplines and perspectives to understand the social, cultural, and economic factors that create and perpetuate occupational health and safety disparities by: 1) examining the major research accomplishments and gaps related to the identification of social, cultural, and economic factors that create occupational health disparities, and 2) identifying and sharing promising practices for eliminating disparities through innovative intervention programs.

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The Superfund Research Program is providing support for ***the 8th International Phytotechnologies Conference Putting Plants to Work where we Live, Labor, Breathe, and Play***". The conference is being held September 13-16 - Portland, Oregon. This conference will bring the scientists, designers, engineers, builders, regulators, and users working with phytotechnologies into one conversation to promote successful implementation and operation of plant solutions that build an ecological relationship with the

landscapes and communities they serve. The meeting website is http://www.phytosociety.org/civicrm/event/info?reset=1&id=3 .

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The National Institute of Environmental Health Sciences (NIEHS) is hosting a workshop entitled, ***"Advancing Research on Mixtures: New Perspectives and Approaches for Predicting Adverse Human Health Effects,"*** on September 26-27 at the Sheraton Chapel Hill, Chapel Hill, North Carolina. The goal of the Mixtures Workshop is to identify and focus on key issues that present challenges in mixtures research (for this workshop, "mixtures" includes combined independent exposures). The NIEHS will use the results from the workshop to inform the development of an intramural and extramural mixtures research strategy. This workshop will also provide input to the scientific community for advancing mixtures research. Specifically, this workshop will identify and prioritize the knowledge gaps and challenges in mixtures research specific to each of the following disciplines: toxicology, epidemiology, exposure science, risk assessment, and statistics; obtain advice on integrating multidisciplinary capabilities to address critical topics in mixtures research; provide recommendations for research on key topics; inform the development of a long-term NIEHS mixtures research agenda; and foster collaborations between extramural and NIEHS scientists. For more information and to register for this workshop, please visit http://tools.niehs.nih.gov/conferences/dert/mixtures/. Deadline to register for this workshop is Monday, September 12.

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The ***Superfund Research Program Annual Meeting*** is being held October 23-26 in Lexington, KY. This meeting will bring together researchers, trainees, and administrators from SRP Research Centers from the U.S. and Puerto Rico. This year's meeting theme will be "Emerging Paradigms to Modulate Risk", explores novel strategies for characterizing and reducing the risk associated with environmental toxins (e.g., green remediation, whole body systems/toxicity, chemical mixtures, nutrition/lifestyle, etc). For more information, see: http://www.uky.edu/Research/Superfund/AnnualMeeting2011/index.html.

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We are beginning the planning process for the next meeting of the full PEPH Program which will be held March 6-8 at the Natcher Center on the main NIH campus in Bethesda, Maryland. The last one was held at NIEHS in April 2010. As details become available we will post them to the PEPH Events page: http://www.niehs.nih.gov/research/supported/programs/peph/events.cfm.

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STAFF CHANGES

Arrivals:

Dr. Molly Puente joined DERT as a Grants Management Specialist on May 23. Molly transferred to NIEHS from the National Center for Research Resources (NCRR) Office of Grants Management. Prior to her work at NCRR, she held rotational positions with NIEHS, the NIH Office of Extramural Research, Fogarty International Center, and the National Institute of Allergy and Infectious Diseases as part of the Presidential Management Fellows program. Molly holds a Ph.D. in Entomology and Masters in Public Administration from North Carolina State University.

Ms. Nicole Popovich joined DERT as a Management Analyst in the Office of the Director on July 5. Nicole comes to NIEHS from NHLBI where she worked in the Office of Workforce Management as a Workforce Development Specialist managing several Institute-wide training and development programs and initiatives. She holds a degree in Communications from Virginia Tech.

Ms. Mitsue Parrish, OM, has been assigned to service DERT as an Administrative Officer as of July 6. She previously served the Office of Management.

Ms. Angie Sanders, OM, has been assigned as the Lead Administrative Officer for DERT as of August 6th. She comes to DERT from the NIEHS Office of the Director where she was a Program Analyst.

Departures:
Dr. Janet Cakir, CRIS/SRP, left NIEHS on July 29 to take a position with the National Park Service to serve as their Climate Change and Socioeconomic Adaptation Coordinator for the Southeast region.

Dr. Elizabeth Maull, SPHB, left DERT on August 13 to take a position with the National Toxicology Program. As part of her new responsibilities she will serve as a liaison between NTP and DERT.

Ms. Margarita Roque, OM, and lead administrative officer for DERT, is leaving as the day-to-day administrative officer for DERT to take a promotion in the Office of Management where she will oversee staff persons who handle the administrative details for two divisions, one of which is to be DERT.

Ms. Michelle Mayo, OM, an administrative officer for DERT, departed from DERT on June 30 to take a promotion within the Office of Management.